



Savannah River National Laboratory™

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2014 • SAVANNAH RIVER NATIONAL LABORATORY

# Research and Technology Recognition Reception

MAY 1 • NEWBERRY HALL • AIKEN SC





# 2014 Research and

PATENTS • LICENSES • CRADAS • COPYRIGHT

“The Savannah River National Laboratory has gained

**worldwide recognition**

as a multi-program laboratory because of the efforts of our distinguished scientists and engineers. We’re pleased to recognize such

**noteworthy efforts** in research and technology.”

**Dwayne Wilson**  
SRNS President and CEO





“This event recognizes the spirit of innovation

at the Savannah River National Laboratory. It is our staff’s

**creativity, dedication and innovation**

that make it possible for us to address some of the most pressing needs of the nation and the world. I am proud to work with the people being recognized today and to call them part of SRNL.”

**Dr. Terry Michalske**

SRNS Executive Vice President and SRNL Director

# Technology Recognition

• LAB DIRECTOR AWARDS • FELLOWS



“Represented here tonight are credible examples of the diverse

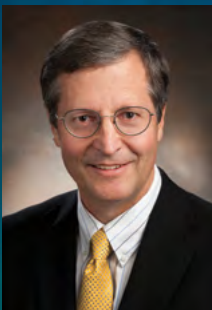
**talent and technologies** worthy of a

national laboratory. Congratulations to all the honorees for your contributions to the Savannah River Site and the nation.”

**Dr. David Moody**

Manager, DOE-Savannah River





## Steve Wach

Director,  
Strategic Development and  
Technology Partnerships *(Acting)*

Welcome to the fifth annual Research and Technology Recognition Reception and congratulations to all this year's honorees. Your research and technology accomplishments greatly benefit our nation, our community and the continued growth of Savannah River National Laboratory as a national laboratory.

It is the results of your diligent research and single-mindedness in meeting the needs of our customers that we honor here tonight. Those results include patents, copyrights, CRADAs, licenses and special recognition of our wide-ranging competencies through the Laboratory Director Awards, the Don Orth Award and Technical Society Fellowships.

Thank you for your hard work and dedication along with the support you receive from your families.

I truly admire your expertise, creativity and innovation.

# Patent Award Recipients



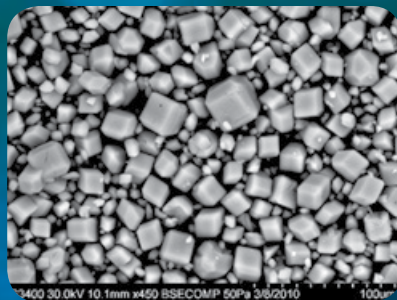
Dr. Zidan

## Dr. Ragaiy Zidan

#8,377,415

### Methods for Synthesizing Alane without the Formation of Adducts and Free of Halides

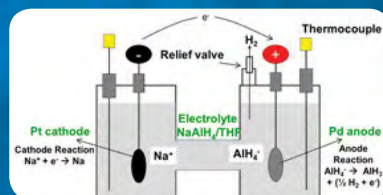
This patented technology is a new process and method to produce high capacity alanes. This new method provides a solid state synthesis route for forming alane which minimizes the requirement of solvents. By minimizing or avoiding solvents, the end product is much more economical for processing on an industrial scale and is a safer material to process.



#8,470,156

### Electrochemical Process and Production of Novel Complex Hydrides

This technology is a process of using an electrochemical cell to generate aluminum hydride ( $\text{AlH}_3$ ). The electrolytic cell uses a polar solvent to solubilize sodium aluminum hydride ( $\text{NaAlH}_4$ ). The resulting electrochemical process results in the formation of aluminum hydride. The aluminum hydride can be recovered and used as a source of hydrogen for the automotive industry. The resulting spent aluminum can be regenerated into sodium aluminum hydride as part of a closed loop process of aluminum hydride generation.



# Patent Award Recipients



Dr. Nance



Mr. McCoy

## **Dr. Thomas A. Nance Frank T. McCoy**

#8,402,843

### **Dissolution Actuated Sample Container**

This passively operated sampler eliminates cross contamination. A new device for retrieving liquid samples, the dissolution actuated sampler was developed to obtain pristine samples while operating without the assistance of a mast or messenger device. The sampler remains sealed during its descent through fluid until it reaches the desired depth. The sampler opens, and fluid is allowed to flow in. When filled, it is resealed to eliminate mixing with superior fluid levels during its ascent. Since it is remotely sealed, it can be washed prior to handling, decreasing the operator's likelihood of exposure. This eliminates the risk of cross contamination, and its passive operation is cost effective.



Dr. Hobbs

## **Dr. David Hobbs**

#8,545,820

### **Use of Titanium-Based Materials**

New materials containing titanium and a small amount of other metals can stop the growth of certain bacteria. In working with researchers at the University of Washington School of Dentistry, it has been shown that these materials limit the growth of bacteria commonly found in the mouth. It is believed that oral bacteria which come into contact with restorative fillings attack the filling, resulting in cavities and the need to replace the filling prematurely. Testing shows titanate/metal materials may be an effective additive to extend the life of restorative fillings. Currently, the University of Washington researchers are testing this idea with volunteers using a material that contains titanium and a small amount of gold prepared at SRNL.



# Patent Award Recipients



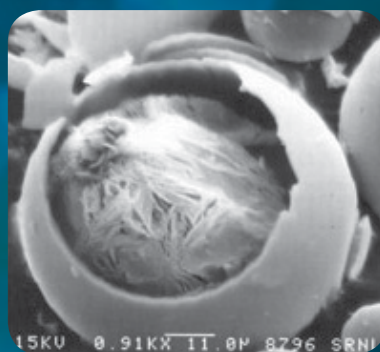
Dr. Serkiz



Dr. Wicks



Dr. Heung



## **Dr. Steven M. Serkiz Dr. George Wicks**

#8,535,725

### **Porous-Wall Hollow Glass Microspheres as Carriers for Biomolecules**

Developments in biotechnology have seen the growing use of biomolecules, such as proteins, peptides, vaccines, antibodies, antigens, etc. This technology is the use of porous-wall hollow glass microspheres to carry a controlled, specific dose to specific locations for medicinal use for diagnostic and therapeutic purposes. Possibilities are injection into bloodstream, topical application, or oral ingestion. Targets could be tumors, use for bone implants and target specific organs.

## **Dr. George Wicks Dr. Leung K. Heung**

#8,377,555

### **Gas Storage Materials including Hydrogen**

This patent relates to the use of porous-wall hollow glass microspheres to store hydrogen. This method of storage would provide safer solid state storage of hydrogen for such applications as hydrogen fueled vehicles.

## **Ray Schumacher**

#8,544,297

### **Apparatus and Process to Enhance the Uniform Formation of Hollow Glass Microspheres**

This technology is a process and apparatus for producing a high yield, uniform size and property distribution of the hollow glass microspheres. An array of small tubes in the burner helps stabilize the flame and improves the temperature distribution in the combustion zone. This improvement in thermal distribution creates a higher yield and quality hollow glass microsphere.

# Patent Award Recipients



Mr. Allen

## Burgess Med Allen, Jr.

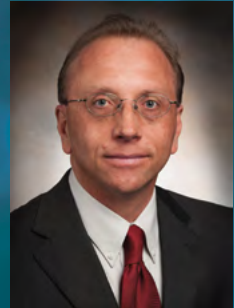
#8,376,172

### Container Lid Gasket Protective Strip for Double Door Transfer System

This invention relates to an apparatus and process related to double door transfer systems used to transport hazardous material into and out of a glovebox without breaching the integrity of the glovebox's internal environment or the container. This uses an adhesive substrate with a foam gasket to secure the lid and ensure the contaminated gasket surface area of the container used with a double door transfer system is sealed and secure.



Mr. Blanton



Mr. Eberl

## Paul S. Blanton Kurt R. Eberl

#8,616,404

### Shipping Container

Recent changes in government regulations for shipping hazardous materials created a need to develop new containers with increased structural integrity and which meet higher standards of rigorous testing. This new packaging design for transportation and storage of hazardous or radioactive materials encapsulates materials in an inner container within an outer one with an improved lid assembly.







Dr. DiPrete



Dr. Whiteside



Mr. Pak



Ms. DiPrete

## **Dr. David P. DiPrete, Dr. Tad Whiteside, Donald J. Pak, Cecilia C. DiPrete**

#8,581,195

### **System and Method for Assaying Radiation**

The Portable Rapid Tritium Analysis System (PoRTAS) was initially designed as a system to measure tritium in the field; however, its light-weight, compact, user-friendly design lends its use to other radionuclides that emit low energy beta and/or alpha particles as well. PoRTAS takes advantage of recently created small, solid-state photomultiplier tubes and multi-channel analyzers by combining them into a single package and then shielding the entire package from external light by wrapping it in an aluminum casing. The radionuclides in a sample are measured by placing an aliquot of the sample in a vial with liquid scintillation cocktail. The vial fits inside a screw cap at the end of the instrument casing. When the cap is attached, the entire device is light-tight. The photomultiplier tube and multi-channel analyzer are controlled by a small computer. The results from using PoRTAS to measure tritium show it is suitable for rapid analysis of radionuclides in the field.



# Patent Award Recipients



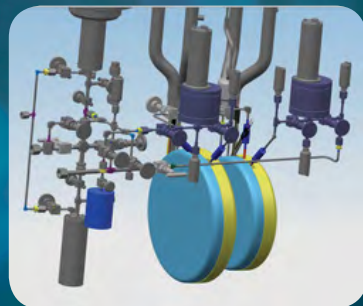
Mr. Sessions



Dr. Xiao



Dr. Heung



**Henry T. Sessions**

**Dr. Steve Xiao**

**Dr. Leung K. Heung**

#8,470,073

## **Apparatus and Process for Separating Hydrogen Isotopes**

This invention is directed towards an apparatus and process for separating hydrogen isotopes from hydrogen streams, including waste streams. It provides for a thermal cycling absorption process using two packed columns where each column can be cooled and heated to cycle appropriate temperatures. Each column may independently be used to absorb/adsorb hydrogen isotopes which can be separated via cooling and heated separation steps. The dual columns have opposite absorption properties toward the isotopes which allows for a mixture of isotopes to be separated into two pure products.

# CRADAs



Mr. Cordaro

## Joseph V. Cordaro

CRADA CR-13-003

### Wind Drivetrain Power Generation Systems and Other Clean Energy Generators

Clemson and SRNL were partners on a proposal with the objective of designing and building the data acquisition and monitoring systems of the proposed wind turbine drivetrain testing facility. A second proposal was to build a grid simulator for full electrical testing of multi-megawatt devices including wind turbines. This CRADA continues the collaboration with Clemson University through commissioning of the facilities. Other technical support activities will include assisting Clemson in the startup, checkout and commissioning of these facilities. SRNL is responsible for building the research data acquisition and control system for both labs.



Dr. Fugate

## Dr. Glenn A. Fugate

CRADA CR-13-002

### Proliferation Detection Research

Thermal Ionization Mass Spectrometry is the gold standard analytical method employed for determination of high precision isotope ratios, especially for low abundance isotopes of an element. It is commonly employed through the government for detection of nuclear forensically-relevant isotope ratios of uranium and plutonium among other elements. The goal of this work is to develop an improved method for loading samples onto the mounts of a Thermal Ionization Mass Spectrometer to facilitate easier sample loading, reduce or eliminate sample loss and potentially result in increased instrument sensitivity.



# Licenses

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Mr. Parker



Mr. Hinz

**Matthew J. Parker**  
**William R. Hinz**

**SoundAnchor™**  
*Metallurgical Engineering Services, Inc.*

This nondestructive method of examining and assessing the structural integrity of tower anchor rods to ensure the rod is not compromised due to corrosion. Ultrasonic energy is emitted through the entire length of the rod to detect small-scale corrosion or cracking within or on the surface of a concrete anchor block. This method produces a permanent record of the examination and can be used to trend rod condition over time or monitor the effectiveness of cathode protection systems used to minimize damage to the buried rod. Such trending is useful for predictive maintenance programs, allowing ample time for replacement well ahead of risk failure. This method is simple and quick, potentially reducing costs to as little as one-tenth the cost of current practice.





Mr. Maxwell

## Sherrod Maxwell III

### Actinide Recovery in Very Large Soil Samples

*Eichrom Technologies*

A rapid actinide separation method has been developed and implemented that allows the measurement of plutonium (Pu), americium (Am) and curium (Cm) isotopes in large soil samples. (100-200 g). Using stacked TEVA Resin™, TRU Resin™ and DGA-Resin™ cartridges from Eichrom Technologies (Darien, IL) allows the rapid separation of Pu, Am and Cm using a single multi-stage column combined with alpha-spectrometry. This provides high tracer recoveries and effective removal of interferences with small extraction chromatography columns, instead of large ion-exchange resin columns that generate acid waste and, with vacuum box cartridge technology, sample prep time is minimized.



Mr. Rucker

## Gregory C. Rucker

### NAPLator

*Compass Environmental and  
CH2MHill, Inc.*

It is essential that environmental engineers have a tool they can use to assess the nature and severity of non-aqueous phase liquid (NAPL) contamination in order to apply and design correct clean-up technology. This a software application will determine if NAPL contaminants are present in soil, groundwater, or soil vapor samples. The software will determine both the quantity and composition of NAPL chemicals in the samples based on the results of sample analysis. The software also computes important environmental engineering measures such as the residual saturation, mass of the NAPL in the sample, and mass balance and phase distribution of each chemical composing the NAPL.



# Licenses



Dr. Wicks

## Dr. George Wicks

### Hybrid Microwave Energy *Hadron Technologies, Inc.*

A team of scientists from the Savannah River National Laboratory and the University of Florida has successfully applied microwave technology to a variety of waste management applications. As a result of this collaboration, unique equipment and processes have been developed using hybrid microwave energy for the destruction of primary and secondary (off-gas) waste in electronic circuitry, medical waste, disposition of radioactive waste, and an assortment of waste streams, immobilization of hazardous constituents, and reclamation of valuable metals. There are currently seven patents issued to date with over two dozen peer review publications.

# Copyrights



Mr. Morrell

## Otto Kirk Morrell, Jr. William Kilgore, Jr.

### Paperless Work Package Application *NextAxiom Technology, Inc.*

The paperless work package system (PWP) is a computer program process that takes information from Asset Suite, provides a platform for other electronic inputs, processes the inputs into an electronic package that can be downloaded onto an electronic work tablet or laptop computer, provides a platform for electronic inputs into the work tablet, and then transposes those inputs back into Asset Suite and to permanent SRS records. The PWP System will eliminate paper requirements from the maintenance work control system.



# Don Orth Award of Merit



Dr. Michalske, Dr. Fink, Dr. Orth

## Dr. Samuel D. Fink

The Don Orth Award of Merit was established in February 1992 to honor Dr. Donald Orth for his numerous accomplishments and contributions. This award is given to an individual who by character, technical performance and leadership best exemplifies Donald Orth's character and contributions. It is the highest distinction at SRS to recognize the ideals of technical excellence and leadership.

# Embassy Science Fellow



## **Dr. Robert L. Sindelar**

### **Embassy Science Fellow**

*Dr. Robert L. Sindelar, Embassy Science Fellow, appointed through the U. S. State Department Office of Science and Technology Cooperation, in support of the Government of Japan (Fukushima Daiichi event)*

Savannah River National Laboratory Senior Advisory Engineer Dr. Sindelar served a three month assignment as an Embassy Science Fellow to support the Government of Japan. The Embassy Science Fellow Program places U.S. government scientists at posts to provide expertise, advice and assistance with science and technology-related issues, such as the Fukushima Daiichi disaster. The program facilitates collaboration with the host government and local entities to meet broad U.S. objectives in science policy, diplomacy, bilateral cooperative science and technology capabilities of U.S. departments and agencies.

The Director of the Department of Energy Japan office solicited the U.S. State Department to provide Embassy Science Fellows to support the Government of Japan's Ministry of the Environment with its lead for the decontamination of the lands surrounding the Fukushima Daiichi NPP site.



# Award Recipients

## Laboratory Director Awards

*Exceptional Scientific and Engineering Achievement*

**Dr. Jeff Allender, Kerry Dunn, Dr. Kevin Fox, Dr. David Hathcock, William Hinz, Dr. James Klein, Sherrod L. Maxwell III, Mark Phifer, Jean Plummer**



Dr. Allender



Ms. Dunn



Dr. Fox



Dr. Hathcock



Mr. Hinz



Dr. Klein



Mr. Maxwell



Mr. Phifer



Ms. Plummer



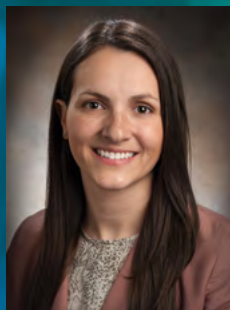
# Award Recipients

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## Laboratory Director Awards

*Early Career Exceptional Achievement*

**Dr. Katie Heroux, Dr. Charles James,  
Dr. Wendy Kuhne, Dr. Aaron Washington**



Dr. Heroux



Dr. Kuhne



Dr. James



Dr. Washington



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